Case Report

Candidal Infection of the Upper Urinary Tract: An Uncommon Cause of Pyonephrosis

Wai-Pong Chu

A 75-year-old man suffered from bilateral pyonephroses secondary to Candidal infection. Pyonephroses were shown by renal sonography and Candidal infection was confirmed by microbiological culture of urine samples obtained from bilateral percutaneous nephrostomies and catheterization of the urinary bladder. [*Hong Kong J Nephrol* 2010;12(2):74–6]

Key words: *Candida*, infection, pyonephrosis, urinary tract

本個案是一位 75 歲的男性，患有念珠菌所引起的雙側腎盂積膿。其腎臟超音波檢查顯示腎盂積膿的現象；念珠菌感染則是基於雙側經皮腎造口術及膀胱導尿後，尿液微生物培養的結果。

Introduction

Pyonephrosis is a urological emergency and can cause life-threatening septic shock if it is not promptly treated. Candidal infection is an uncommon cause of pyonephrosis. This report is of a 75-year-old man who presented with fever, bilateral loin pain and acute renal failure. Renal ultrasound showed features of bilateral pyonephroses. Microbiological culture of urine samples obtained from urinary bladder catheterization and bilateral percutaneous nephrostomies (PCNs) grew *Candida albicans*.

Case Report

A 75-year-old man was admitted to our hospital in March 2010 because of right loin pain for 1 month and acute onset of shortness of breath. The patient had a history of chronic obstructive pulmonary disease and he required long-term oxygen and steroid use. There was no history of hematuria or antibiotic use before this admission.

After the patient was admitted, he developed fever, and blood tests showed an elevated white blood cell count of 15.8×10^9/L (reference range, 4.0–10.0×10^9/L) and neutrophilia 92.1% (reference range, 40.0–80.0%). Serial serum creatinine showed a level as high as 447 μmol/L (reference range, 55–103 μmol/L), which indicated acute renal failure. His serum creatinine had been normal around 1 month before this admission. KUB showed bilateral renal stones, bilateral upper ureteric stones and urinary bladder stones.

In view of the fever, bilateral loin pain and acute renal failure, the clinical diagnosis was acute bilateral pyelonephritis. Urgent ultrasound was arranged to rule out urinary tract obstruction. Bilateral hydronephroses and multiple renal stones were found. Echogenic debris was observed within the dilated right pyelocalyceal system (Figures 1 and 2). Similar findings were noted over the left kidney (Figure 3). The sonographic diagnosis was bilateral obstructive uropathy and pyonephroses.

Bilateral PCNs were performed and pus was yielded over bilateral dilated renal pelvises. Microbiological culture of the urine aspirated from each of the renal pelvises grew *Candida albicans*. Catheterized urine microbiological culture also grew the same species of fungus. Blood culture was negative for *Candida*. Serum creatinine decreased after the PCNs and the level became normal 6 days after the radiological procedures. Oral fluconazole 100 mg daily was prescribed.

However, the patient developed pneumonia after admission; consolidation of the lower lobe of the left lung and left pleural effusion were noted on serial chest radiographs. Sputum microbiological culture found

Department of Radiology, Princess Margaret Hospital, Kowloon, Hong Kong SAR.
Correspondence to: Dr. Wai-Pong Chu, Department of Radiology, Princess Margaret Hospital, Lai King, Kowloon, Hong Kong SAR.
E-mail: drvictorchu@yahoo.com

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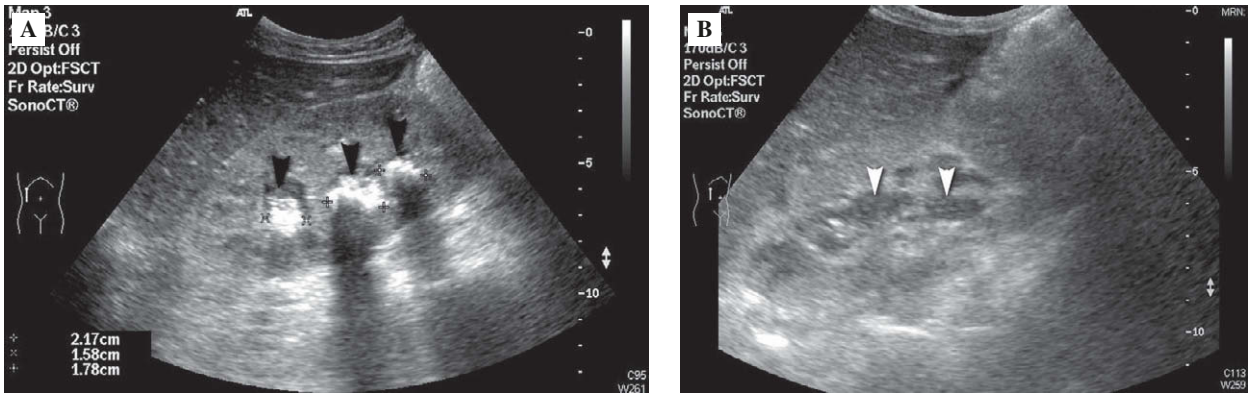

Figure 1. Longitudinal ultrasound images of the right kidney obtained in (A) supine and (B) right anterior oblique positions show right hydronephrosis, multiple renal stones (black arrowheads) and low level echoes within the dilated pyelocalyceal system (white arrowheads).

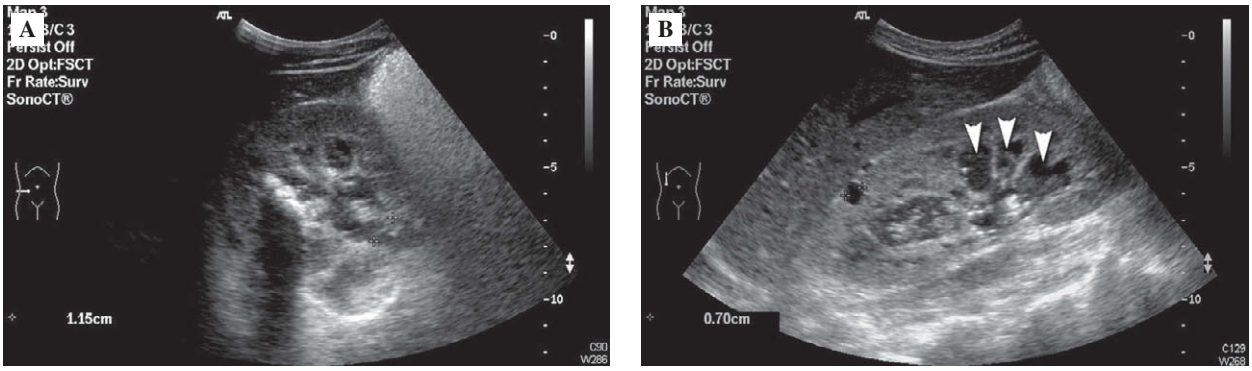

Figure 2. (A) Transverse and (B) longitudinal ultrasound images of the right kidney obtained in supine position confirm the presence of low level echoes within the dilated calyces over the interpolar region and the lower pole (white arrowheads).

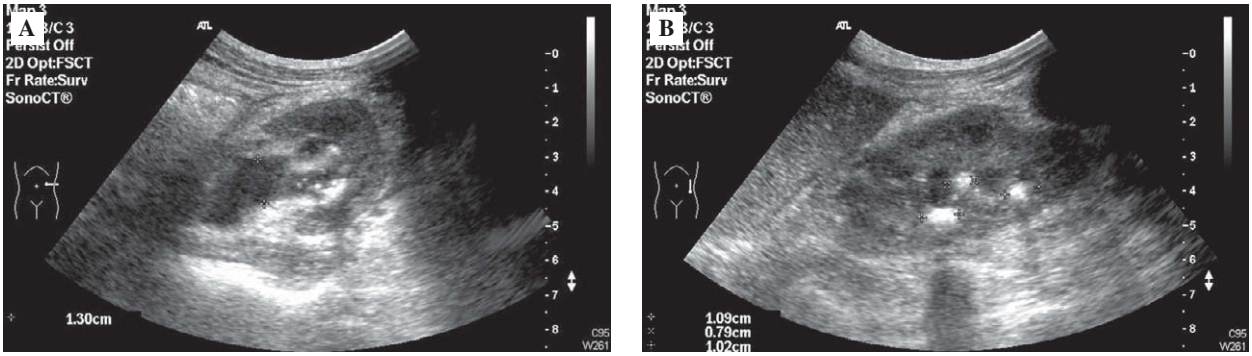

Figure 3. (A) Transverse and (B) longitudinal ultrasound images of the left kidney show similar findings to those of the right kidney.

methicillin-resistant *Staphylococcus aureus*. The patient developed respiratory failure and died 3 weeks after admission.

Discussion

Most patients with uncomplicated acute pyelonephritis do not require imaging study. In patients with complications (e.g. diabetes, immunocompromised status, history of stones and failure to respond to therapy), abdominal and pelvic computed tomography is the imaging of choice [1].

However, ultrasonography carries many advantages, which include its relatively low expense, absence of ionizing radiation and, most importantly in patients with acute renal failure, it does not require the use of contrast material. Sonography is also very specific (100%) for diagnosing pyonephrosis, which is a urological emergency [2]. Pyonephrosis implies purulent material in an

obstructed urinary system. Early diagnosis of pyonephrosis is essential to prevent life-threatening septic shock.

Detection of internal echoes within the fluid-filled collecting system in patients with clinical suspicion of renal infection is considered to be a highly sensitive (90%) finding of pyonephrosis [2]. This finding also helps to distinguish pyonephrosis from simple hydronephrosis. Other possible findings of pyonephrosis include a fluid debris level and collecting system gas. Renal stones are common associated findings [3].

Candidal infection of the collecting system can be caused by direct ascent from the urinary tract or disseminated infection. Immunosuppression (e.g. long-term steroid use), diabetes mellitus and obstructive uropathy enhance vulnerability to upper urinary tract infection by a non-hematogenous route [4]. *Candida* species may present as commenals in the absence of infection. Fungal debris, debris due to other infections and blood clots can lead to similar appearance on renal ultrasound images. Clinical symptoms and urine microbiological cultures are essential to establish the correct diagnosis.

Asymptomatic candiduria rarely requires therapy. Candiduria should be treated in symptomatic patients, neutropenic patients, low-birth weight infants, patients with renal allografts and patients who plan to undergo urologic manipulations [5]. Removal of any urinary tract instruments, including ureteric stents and Foley catheters, can be helpful in eradication of candiduria. Choices of therapy include oral fluconazole 200 mg, amphotericin B at widely ranging doses of 0.3–1.0 mg/kg/day and, in the absence of renal insufficiency, oral flucytosine 25 mg/kg four times daily [4]. The recommended duration of therapy is 7–14 days [5].

Urinary tract obstruction and pyonephrosis are two of the major indications of PCN. The reported success rate of PCN has been as high as 99%, but the rate decreases in non-dilated pyelocalyceal system, staghorn stone and complex stone disease [6]. PCN can provide the urinary access for endourological intervention such as pyeloureteroscopy and percutaneous nephrolithotomy. Major complications of PCN include septic shock, hemorrhage and vessel injury. Hemorrhage is usually self-limiting after PCN. The local reported complication rates of hemorrhage requiring transfusion and vessel injury requiring embolization or nephrectomy were 2.8% and 1%, respectively [7]. For decompression of obstructed urinary system, internal ureteric stenting by retrograde catheterization of the ureteric orifice and PCN are apparently equally effective [8]. The choice of treatment therefore depends on the availability of expertise and facilities.

In summary, a patient with bilateral urolithiasis and pyonephroses secondary to *Candida* infection has been reported. The urinary tract obstruction was relieved by PCNs, with serum creatinine levels normalizing after the radiological procedures.

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